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Subarachnoid Alcohol Block in Paraplegia: Involuntary reflex spasm of the paralyzed muscles is present to some degree with most patients following permanent injury to the spinal cord. The cause of these powerful muscular contractures remains a mystery. Likewise, the absence of this mass reflex in some patients is equally difficult to explain.

Immediately after injury a period of so-called spinal shock exists, during which the paralysis is flaccid in character. Some weeks later reflex activity reappears and may progress to marked hyperactivity and involuntary muscular spasms. At times the reflex spasm, evoked by simply touching the skin over the paralyzed area, may be so powerful that it is physically impossible for the examiner to overcome the strength of the muscular contractions.

Every paraplegic patient's greatest desire is to walk, even though it may be only with the aid of braces and crutches. The mass reflexes serve as a formidable obstacle to this achievement. The patient cannot maintain an erect position even if he is physically able to handle crutches with his arms and shoulders. Flexion deformities are frequent, often with secondary structural contractures. These add to the patient's discomfort an increase the danger of trophic ulcers. Control of ulcerated areas, much less repair, is impossible if the deformities persist.

Reflex spasm frequently involves the pelvis and abdomen. The urinary problem is increased because of reflex bladder spasm. Abdominal spasms are a source of great annoyance to the patient, at times painful, and greatly interfering with his rest and sleep.

Anterior rhizotomy has been used to relieve mass flexion reflexes with excellent results in selected cases. The procedure consists in section of the anterior spinal nerve roots from the tenth thoracic through and including the first sacral nerve root bilaterally. Thus, the spastic paralysis of a spinal cord lesion is converted into the flaccid paralysis of a lower motor neuron lesion.

Section of the motor nerve roots does away with all hope of recovery. The psychic trauma must be great, and this element of the patient's illness must not be neglected. If the spinal cord lesion was not anatomically complete at the time of local exploration, no one can honestly assure a patient within the first 2 or 3 years that some degree of recovery is impossible, even though experience would make the prospect negligible. Every patient has heard of someone who has had slight return of function after a long period of complete paralysis, and he lives in hope that some return of function will occur in him.

From the surgical standpoint, rhizotomy is satisfactory, but identification of the proper nerve roots is not as simple as generally considered.

There was a definite need of a simpler method that would achieve the same result as rhizotomy, namely, a procedure for paraplegics that is comparable

to the injection of alcohol for major trigeminal neuralgia.

Subarachnoid injection of alcohol fulfills the desired criteria. The method is simple, requiring only a lumbar puncture. The systemic effects are negligible, and the relief of spasticity is immediate.

Subarachnoid injection of alcohol has been employed for years for control of pain, but the amounts used have never been sufficient to control spasticity except for the recent work of Pudenz and Nourse, whose data are soon to be published.

The selection of patients for alcohol injection was based on the severity of the mass reflex and the status of their urinary bladder. No patient was considered as a candidate for injection if he had any degree of voluntary bladder control or if he had developed a reasonably satisfactory type of automatic bladder function.

All patients injected had a complete paraplegia of both legs of at least one year's duration with no evidence of improvement in their motor function.

Pre-injection studies include a complete check of testing the bulbocavernosus reflex, the amount of residual urine, cystoscopic, cystometric, sphincterometric and cystographic examinations (as part of urographic studies) with and without spinal anesthesia. Spinal anesthesia in connection with these examinations proved to be of value for the future prognosis of the respective bladder conditions. The importance of cystography in the management of the bladder in paraplegic patients has been stressed in a previous publication.

This procedure will detect vesico-ureteral reflux which contraindicates the use of tidal drainage.

The technic of subarachnoid alcohol injection is simple. The patient is placed on his side. No pillow is used under the patient's head, but a large pillow is placed between the knees. The foot of the bed is placed on two chairs so that the maximum elevation of the legs and pelvis is obtained. The injection is made routinely at the interspace between the first and second lumbar vertebrae through an 18 gauge spinal puncture needle, but blocks as high as D11-D12 have been used where indicated. Five c.c. of cerebrospinal fluid are removed, and from 10 to 15 c.c. of absolute alcohol are injected slowly. The patient is immediately rolled onto his back and left in this position for 24 hours. Because the alcohol is lighter than the cerebrospinal fluid, the feet of the bed must remain elevated during this 24-hour period.

During injection scattered mild muscular twitching is occasionally observed, but the patient experiences no discomfort. Meningismus and headache were noted a few hours after injection by the first few patients, but this was probably due to an insufficient period of elevation of the foot of the bed.

Effect on Mass Reflex Spasms. Complete relief of the reflex spasms was obtained immediately in every one of the 24 patients. The first patient was

injected 23 July 1946, and he has shown no evidence of return of any spasticity. Only one patient has shown any recurrence of muscular spasms, and they are of infrequent occurrence, minimal degree and limited to one leg.

Effect on the Bladder. In this series of 24 patients studied, 16 had atonic and 8 hypertonic types of bladder. The atonic bladder presents evidence of an atonic detrusor associated with a spastic pelvic floor including the sphincteric mechanism. This type is characterized by more or less complete retention. In this group of 16 patients, 12 had complete retention and 4 residual urine varying from 12 to 14 oz. After alcohol block 11 patients had voluntary micturition with residual urine amounting to less than 3 oz. The remaining 5 patients showed definite improvement but had residual urine of more than 3 oz. Bladder training as outlined by Munro was of definite value in this latter group of patients and slowly enhanced the beneficial results of alcohol injection.

In this entire group with atonic bladders, the bladder capacity after block ranged between 300 and 400 c.c., and in a few patients the capacity dropped to less than 300 c.c. Only one patient in the entire series was not at least partially relieved of his complete retention.

The hypertonic type of bladder is characterized by a small capacity and frequent involuntary emptying, often a spurt of urine with each muscular spasm. There were 8 patients in this group, and all had a bladder capacity of less than 200 c.c., the average being between 50 and 100 c.c. All 8 patients developed voluntary micturition following subarachnoid alcohol injection, and the bladder capacity usually increased to from 300 to 400 c.c. At the same time the ratio of capacity to residual improved. Several patients with 50 c.c. capacity and 30 c.c. residual prior to block developed a 200 c.c. capacity with little or no residual urine. All patients in this group voided satisfactorily with voluntary micturition every 2 hours.

Effect on the Bowel. Bowel disturbances after alcohol block were observed on 18 patients. They consisted chiefly of constipation (13 cases) which lasted from one and one half weeks to several months; 3 patients had involuntary movements, and 2 displayed the combination of involuntary movements with alternating constipation. No change of bowel habits was present in 8 patients. It is generally known that training to achieve regulated bowel habits after cord injuries is easier than the training of bladder function. The reason for this lies probably with the independent Meissner-Auerbach plexus and also with the physiologic peristalsis whereby the upper intestinal segment initiates impulses to the lower segment. This explains why disturbances after alcohol block responded relatively easily to corrective measures.

Effect on Sex Function and Sexual Dreams. It was not surprising that 22 out of 24 patients lost erections after alcohol block. Two patients reacted differently in that one did not lose his erections at all, and the other regained them within 4 weeks. Such exceptional response could be explained only by surmising that an individual variety of autonomic innervation existed in the respective

cases. Return of semi-erections, insufficient for sexual relations, was observed in 7 patients. In the entire group of 24 patients there were only 5 who did not have erections prior to block. This is well in line with the rather high incidence of erections in paraplegics. Whereas successful sexual relations occurred in 5 patients before block, such was experienced by only one patient after the block.

If one combines the investigations of sex function with a routine exploration of sexual dreams one encounters a strikingly high incidence of dream changes after alcohol block. Out of 17 patients with sexual dreams before block, 6 underwent dream conversion after block. Five patients lost sexual dreams entirely whereas a sixth patient who had complete sexual dreams prior to block had only incomplete dreams after block. Nocturnal ejaculations were rare in this series. One such patient lost dreams and nocturnal ejaculations after block. The causes for such dream changes are not as yet known. It is possible that organic factors beside a mental reaction are responsible. In this connection it appears worth mentioning that erections and complete dreams with ejaculations were lost in one patient subsequent to an anterior rhizotomy which was probably carried too far.

Subarachnoid alcohol injection is not intended to supplant rhizotomy; each procedure has its definite indication. Rhizotomy should be done in those individuals with severe mass reflexes who possess a satisfactory type of bladder and sexual function. In these individuals surgical resection of the anterior roots through S-1 will relieve the spasticity without loss of sexual function, but does not as a rule improve the bladder function unless the root section is accidentally carried low enough to sever the second and third sacral roots. It has been demonstrated (Shelden and Thompson) by direct stimulation experiments that the third sacral root is chiefly responsible for contraction of the sphincteric mechanism. The function of this root has been further demonstrated by local sacral injection and pudendal nerve injection. Cystograms reveal relaxation of the sphincter with both procedures.

Subarachnoid alcohol injection has proven to be a very satisfactory method for control of mass reflexes. After the spasticity has been eliminated, structural contractures can often be overcome by extensive physiotherapy. Pain has been relieved in a few of the patients, although it was not a major complaint with any of those selected for injection.

The duration of the beneficial effect cannot be determined at this time. It is possible that if spasticity should return the procedure could be repeated with equally satisfactory results. After a few years the factors causing the spasticity may burn themselves out and no further procedure be necessary. The great advantage of alcohol over rhizotomy is immediate complete relief obtained without a major surgical procedure or the sacrifice of any nerve roots.

If these sacral roots are severed surgically, nothing is gained that could not be equally well accomplished by alcohol injection.

Subarachnoid alcohol injection should be reserved for those patients with incapacitating mass reflexes who have atonic bladders with excessive residual urine or hypertonic bladders with small capacity and frequent voiding. The sexual capacity should be seriously considered. No patient with satisfactory erections should be injected unless the probable loss of sex function would be compensated for by the establishment of voluntary micturition. (J. Neurosurg., July '48 - C. H. Shelden and E. Bors)

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A New Ureteral Stone Basket: The author describes a new ureteral stone basket which he has been using for over 2 years. It has been used successfully through various No. 24 sheaths, and the Ravich No. 21. It is preferable if one or more ureteral catheters can be passed by the stone and left in place from 24 to 48 hours before using the basket.

In the construction of this basket, the author requested the manufacturer (C. R. Bard, Inc.) to have the proximal ends of the basket wires extend some distance back inside the hollow metal shaft so that if one broke loose at the proximal attachment it would not be free to perforate the ureter and require open surgery for removal. At the forward or distal end of the basket there are no single ends to get loose, for each of the 2 wires forming the basket are continuous and double back to re-enter the hollow shaft.

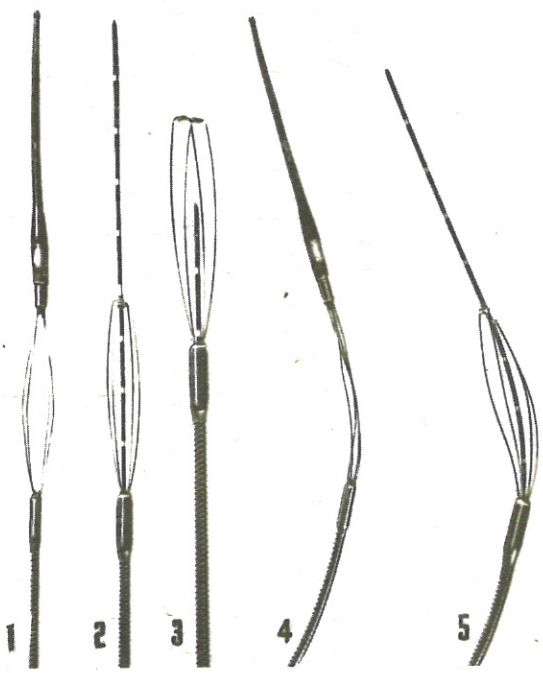

FIG. 1. 1, Old ureteral stone basket, size scant 10 F. 2, New, same diameter. 3, New, open. 4, Old, curved. 5, New, curved.

The author has been able, when he desired, to withdraw the basket after engaging a stone of some size; he considers this to be facilitated by the very nature of this doubling back of each wire, which at the distal or forward end forms a loop. These 2 distal loops are locked together either by a bougie or whalebone filiform, or preferably by a ureteral catheter which is indwelling and movable within the hollow flexible shaft of the instrument, for it also is in the double loops of the basket. To release or open the basket, withdraw the catheter into the shaft, and the stone disengages as the basket is pulled into the bladder.

This 3 or 4 F catheter serves as a flexible tip of any desired length and passes a stone more readily than the 10 F tip of the old basket. Another advantage is that the catheter may be introduced into the ureteral orifice and passed beyond

the stone, as any other catheter is, while the basket proper yet remains within the sheath of the cystoscope. A wire stylet may be used in the catheter to stiffen it when needed. The basket is pushed from the cystoscope into and up the ureter with the catheter serving as a lead or guide until the stone is engaged. If a stylet is used it may be best to pull it down before withdrawing the basket and catheter, because if the catheter is too stiff, it may crowd the stone out of the basket.

In past years the author wondered why a basket so often failed to withdraw a stone even though it was passed alongside and had apparently engaged the stone. Figure 1, number 4 shows how a basket may flatten and open up when on a curve, as in a fixed pelvic ureter. This may be demonstrated readily by flexing the basket in one's fingers. Figure 1, number 5 shows what may also be demonstrated by flexing the new basket in the fingers. It does not open because the distal end of each pair of wires is not fixed but free to slide independently on the guide. The author believes that this accounts for the increased success with the new basket.

A certain amount of rotation of the basket facilitates engagement of the stone. In using the old basket, the rotation should always be clockwise to avoid unscrewing the tip. With the present basket this precaution is not necessary. (J. Urol., Aug. '48 - W. P. Morton)

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Chronic Infectious Mononucleosis: This is a study of 53 patients who had infectious mononucleosis and who had some symptoms which persisted for from three months to four years or longer. The persisting symptoms included ease of fatigue, exhaustion, aching of the legs, weakness, depression, afternoon elevation of temperature (99.8 to 101° F.), moderate splenomegaly, low blood pressure, low blood sugar, often low specific gravity of the urine, and the presence of infectious mononucleosis cells in the blood.

Of these 53 patients, 22 were males and 31 were females. The ages ranged from 8 months to 60 years. There were 5 younger than 19 years; 12 from 20 to 29 years; 16 from 30 to 39 years; 15 from 40 to 49 years; and 5 from 50 to 60 years. The 8-month-old child had shown unusual diarrhea ("dysentery") since birth, and examination of the blood showed infectious mononucleosis cells. The mother had acute infectious mononucleosis during pregnancy, one month before the birth of the child. Thirteen of the patients had the symptoms for from 3 to 6 months; 15 for from 7 to 12 months; 3 for from 17 to 18 months; 11 for one year; 8 from two and one half to 4 years, and 3 for at least 6 years. Some of the patients could give the exact date of the start of the symptoms, others could place the onset within a month or so. Five gave the duration as "several months," "several years," and "many years."

These patients had been sent in for study, with possible diagnoses of undulant fever, tuberculosis, Addison's disease, Hodgkin's disease, Rocky Mountain spotted fever, lymphosarcoma, hypothyroidism, menopausal syndrome, subacute bacterial endocarditis, neurasthenia, and syphilis.

All of these 53 patients showed infectious mononucleosis cells in the blood. The red blood cell and leukocyte counts and hemoglobin content were within normal limits. The infectious mononucleosis cells were of the mature type, with deeply basophilic cytoplasm, staining the peculiar blue characteristic of these cells. The nuclei showed the streaky chromatin, with fenestrations, and were often indented. Occasionally one or more of the large forms found in the acute type were noted. These cells constituted from 1 to 7 percent of the total leukocytes, rarely higher. These cells had been grouped with the lymphocytes or monocytes by uncritical technicians.

In none of these patients was the sheep cell (heterophile) agglutination titer above 1:64. Five patients had shown persistently positive Kahn tests, characterized as "general biologic reaction," for from one to six years.

The presenting symptom was always weakness or ease of fatigue. The patients said that their legs were weak and ached. The fatigue was usually present on arising in the morning, but occasionally developed late in the morning or during the afternoon. Some had symptoms suggestive of hypoglycemia. Others had mental depression, nervousness, ease of perspiration and spells of dizziness on arising.

The fatigue appeared out of proportion to the physical data. The usual findings were a slightly enlarged spleen, about from 14 to 16 centimeters, occasionally palpable on deep inspiration, depending on the patient's body-build. The spleen could be outlined by direct percussion, using very light tapping. It could be demonstrated by x-ray examination. The enlarged spleen elevated the cardiac apex, while the patient was lying down, so that the cardiac tip was from 10 to 11 cm. to the left of the midline. On standing the apex lowered to about 9 cm. to the left of the midline.

The second feature noted in most of the patients was the comparatively low blood pressure. The systolic figures were from 90 to 105, occasionally as high as 115, with diastolic pressures of from 56 to 70. This was considered significant, for most of the patients belonged to the older age group. There were no definite signs of myocardial or circulatory insufficiency.

In most of the patients who made observations on their temperature, there was an afternoon rise to from 99.6 to 101.4° F. Rarely was it higher than this, but in some the elevation was so persistent that their condition had been diagnosed as "fever of unknown origin" or they were suspected of having undulant fever, Hodgkin's disease or tuberculosis.

Most of the patients had some lymph nodes which were palpable, but never very large. Enlarged posterior cervical nodes were the most common. In many, the nodes were well within the normal limits of size.

A number of patients had symptoms suggestive of hypoglycemia. The blood sugar (fasting, after food, and at intervals after sugar ingestion) was observed in 10 individuals. The fasting blood sugar showed levels of from 33 to 70 mg. per 100 c.c. using a method in which most normal individuals showed from 80 to 110 mg. per 100 c.c. Isolated observations on other patients in the group showed levels of from 80 to 95 mg. per 100 c.c. After ingestion of a meal or a measured amount of glucose, there was but slight increase in the height of the glucose curve (increased tolerance), and the fall was slow, although 3 individuals showed a lower level than the fasting level between 3 and 5 hours after the ingestion of the glucose.

The serum sodium, potassium, and chlorine were within normal limits in these patients. None of the patients showed unusual pigmentation.

In 12 of the patients, because of a low basal metabolic rate, medications to increase the activity of the thyroid had been prescribed; however, the abnormal fatigue persisted.

The only feature of the urine which was present in most of the individuals was a low specific gravity of individual specimens taken at random during the morning or afternoon. Values from 1.001 to 1.008 were common, and values higher than 1.010 were unusual in this group.

In 3 patients, although the onset had been typical of acute infectious mononucleosis, material from lymph nodes had been obtained by biopsy. The sections were interpreted variously by different observers, and x-ray therapy was given over all the glandular areas by the patients' doctors. These patients later had a recurrence of the glandular enlargements, and one was diagnosed as lymphosarcoma, one reticulum cell sarcoma, and one Hodgkin's disease. They continued to show clear-cut infectious mononucleosis cells in their blood. The "lymphosarcoma" patient received intensive x-ray treatment from several doctors, as well as nitrogen mustard until he died of emaciation. The results make one wonder if lymph nodes, injured or made more susceptible by infectious mononucleosis, may be made to show malignant characteristics after x-ray therapy.

In another group of patients, 2 showed progressive enlargement of the spleen and were later classed as having "Banti's disease." It is possible that some congestive splenomegalies may arise in this way.

In the differential diagnosis, undulant fever presents the most difficult problem. The various tests for degrees of immunity are not diagnostic of the disease, and a positive blood culture is not easily obtained from patients who have the chronic form. The presence of infectious mononucleosis cells in the blood is a differential point, although an individual could have had both diseases. When the Kahn test was positive in these patients, it was of the general biologic type.

Many therapeutic agents were tested without success. These included caffeine, amphetamine sulfate, strychnine, thiamine, atropine, multiple vitamin mixtures, thyroid extract, ephedrine and special diets. These substances produced no lasting effect, and often accentuated the nervousness. What appeared to be the most promising medicine was a preparation of adrenal cortical extract (cortalex). This was given in doses of 2 tablets (made from aqueous extract of 10 grams of adrenal gland) on arising in the morning. There was but little subjective improvement during the first week, but a definite feeling of well being developed during the second week and increased during the third week. After this the medication was discontinued and the improvement usually continued. In a few patients it was necessary to increase the dose, or resume it after its discontinuance. Associated with the subjective improvement, there was a decrease in the size of the spleen. The changes in the blood pressure were slight.

The fact that the symptomatology is somewhat suggestive of adrenal insufficiency of the Addison's disease type, and that the administration of adrenal cortical extract by mouth relieved the patients after the symptoms had persisted for long periods, suggests a possible mechanism for the fatigue during the chronic stage.

The occurrence of this syndrome following infectious mononucleosis is apparently not uncommon and the intense, prolonged debility, together with the marked improvement after therapy with adrenal cortical extract, makes its recognition of great practical importance. (Blood, J. Hematol., Aug. '48 - R. Isaacs)

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The Effect of the Ingestion of Sodium Acid Phosphate on Urinary Calcium in Recumbency: It has been known for many years that patients who are recumbent for prolonged periods of time are apt to form urinary calculi. However, it was not until the recent war, when large numbers of orthopedic casualties were assembled in one institution, that the full importance of this problem became apparent. For instance, at Mayo General Hospital in 18 percent of all patients with fractured femur, there was x-ray evidence of urinary calculi; at Gardner General Hospital, 10-percent of 60 patients studied had urinary calculi, and at England General Hospital, a paraplegic center, of 108 paraplegics studied 13 percent had renal calculi, 27 percent had bladder calculi and 2.7 percent had both. From these figures, it can be seen that the problem of calculus formation in these patients is one of importance. Ninety-five percent of all stones formed under these circumstances were composed of calcium phosphate.

Several factors are involved in the production of calculi in these individuals. They have been best summarized by Flocks, who listed three general factors as being of principal importance. The first of these is stasis. When a patient is supine, minor calyces are dependent and small particles which crystallize out

of the urine are apt to fall into them and coalesce to form calculi. A second factor is that of infection, which is particularly prominent in paraplegics in whom there is marked stagnation of urine. This complication can be controlled comparatively well with antibiotics. A third factor is that of hypercalcinuria, which has been found to be present in a high percentage of recumbent patients.

Howard, Parson and Bigham found that after fracture or osteotomy with immobilization, urinary calcium rose until the negative protein balance had passed, then remained constant for from 30 to 60 days, or until the patient was mobilized. It was found that, under these circumstances, diet had very little effect on urinary calcium. A relatively large shift of calcium intake produced practically no change in the amount of calcium excreted in the urine. No effort was made to control the diet because it was desired to ascertain the response of these patients under routine ward conditions.

Studies were carried out in 71 cases of recumbency. Determinations were made on the basis of total output on three successive days with each 24-hour specimen being analyzed separately and an average of the 3-day total made. Over-all average daily excretion of calcium in recumbency was 310 mg. in comparison with an average of 223 mg. per 24 hours in a series of 20 ambulatory controls on the same general diet: 47.88 percent had a 24-hour output of 250 mg. or less; 26.76 percent excreted between 250 and 350 mg. per day, and 25.36 percent excreted 350 mg. and above. Thus, approximately 50 percent were above the average figure given as normal for the 24-hour excretion of urinary calcium. Blood calcium and phosphorus were within normal limits in all cases.

In addition to recumbency, there are several chemical factors which produce hypercalcinuria. The ingestion of acidifying drugs such as ammonium chloride was found to double and sometimes even treble the output of urinary calcium. Likewise, a high acid-ash diet had a similar effect. With hyperparathyroidism there is a marked elevation of both blood and urinary calcium. Similar findings are present in Cushing's syndrome.

Apparently, there is a balance within the body between calcium and phosphorus. In conditions such as tetany and terminal nephritis, in which there is an elevation of serum phosphorus, there is a lowering of serum calcium. Binger produced tetany in dogs by injecting sodium phosphate intravenously, thereby lowering serum calcium. Conversely, in hyperparathyroidism and Cushing's syndrome in which an elevation of serum calcium occurs, there is usually a reduction in serum phosphorus.

The major portion of calcium in the body is stored in the skeleton as calcium phosphate. Therefore, in recumbency where calcium is being mobilized from the skeleton, it would seem that the process could be retarded or reversed by the production of a positive calcium phosphate balance in the blood stream. Sodium acid phosphate appears to be the drug of choice for this purpose. It

moderately reduces the pH of the urine, a favorable factor in reducing precipitability of calcium. It decreases intestinal absorption of calcium by combining with calcium in the upper intestinal tract to form insoluble calcium phosphate. In addition, it supplies a source of added phosphates to the body, thereby producing the previously mentioned positive calcium phosphate balance. Phosphates are excreted in the urine principally as sodium acid phosphate, very little being excreted as insoluble calcium phosphate or magnesium ammonium phosphate. This fact is of clinical importance because some years ago Boyd advised against the use of sodium acid phosphate in recumbency because of the tendency to phosphaturia which he believed it produced. He presented no experimental evidence to support this impression and in the experience of the authors phosphaturia has not been a factor of any importance.

As far as the authors have been able to determine, sodium acid phosphate with relation to urine calcium has been studied on two previous occasions. Albright, Bauer, Claflin and Cockrill studied 3 cases of hyperparathyroidism and found that they were able to reduce serum calcium and that a diminution in urinary calcium excretion resulted. Farquharson, Salter and Aub studied 4 cases of hyperparathyroidism and found a slight decrease in 2 cases and no change in the other 2. The authors recently observed the response to sodium acid phosphate in one case of typical hyperparathyroidism. Following the administration of 8 Gm. of sodium acid phosphate daily for 6 days preoperatively the urinary calcium was reduced from 955 mg. to 572 mg. During this period there was a significant elevation of serum phosphorus but serum calcium remained constant. Postoperatively the anticipated fall in serum calcium appeared almost immediately. During convalescence, sodium acid phosphate was again administered, with a resulting marked rise in serum phosphorus and a moderate fall in serum calcium. At the conclusion of this period urinary calcium had reached the surprisingly low level of 22 mg. in 24 hours. On cessation of the drug, serum phosphorus returned to normal levels and there was a moderate elevation in serum calcium. These findings were present in spite of the administration of fairly large doses of calcium gluconate by mouth.

BEFORE *gm.*	AFTER *gm.*
618	316
600	144
543	301
509	347
445	238
443	150
407	287
406	304
384	129
359	193
279	221
269	114
200	100
184	139
144	121
72	17
366	189 Average

The effect of the ingestion of sodium acid phosphate was studied in 16 patients most of whom were recumbent. In all cases determinations were made on 3 successive days and the average 24-hour output was determined. The patients then received 5.8 Gm. of sodium acid phosphate daily for a period of 10 days, determinations again being made during the last 3 days. All 16 patients had normal serum calcium and phosphate levels. The results appear in the table on the left.

A definite reduction of urinary calcium occurred in every instance. The average output before administration was 366 mg., and after, 189 mg., a reduction of approximately 50 percent.

In addition to the above, a study was made in the case of a 22-year-old male with urinary symptoms of 4 months' duration, with cystoscopic findings typical of incrusted cystitis. Urine specimens were collected through ureteral catheters, and what was believed to be a true hypercalcinuria was found. Usual methods of treatment were employed but incrustations persisted and urinary calcium remained elevated. After the prolonged administration of sodium acid phosphate urinary calcium returned to a normal level. The patient became symptom-free and all incrustations disappeared. The impression is that hypercalcinuria may occur in cases of incrusted cystitis and may be a contributing factor in the production of this lesion.

The authors conclude (1) that hypercalcinuria is an important factor in the formation of urinary calculi in recumbency and (2) that urinary calcium can be definitely reduced by the administration of sodium acid phosphate. (J. Urol., Aug. '48 - J. J. Cordonnier and B. S. Talbot)

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Preliminary Report on the Beneficial Effect of Chloromycetin in the Treatment of Typhoid Fever: Chloromycetin has been clinically tested in typhoid fever and has been found to exhibit significant chemotherapeutic effects. A description of the results in 10 cases is submitted as a preliminary report.

In the course of an investigation of the chemotherapeutic value of chloromycetin in the treatment of scrub typhus fever on the Malayan peninsula in the vicinity of Kuala Lumpur, the authors encountered numerous cases of typhoid fever which is endemic in this area and tends to be of a clinically severe type, the febrile course not infrequently running 6 or 7 weeks.

The diagnosis in the 10 treated patients was confirmed by a blood culture positive for Eberthella typhosa prior to the use of chloromycetin which was administered orally. The initial dose in each case was 50 mg. per kilo of body weight. Thereafter 0.25 Gm. was given every two hours until the temperature was normal and the same dose every 3 or 4 hours thereafter during the first 5 days of normal temperature. The total dosage per patient averaged 19.1 grams given over a period of 8.1 days. The drug was well tolerated and no clinical evidences of toxicity were observed.

The blood level for chloromycetin was followed throughout the course of treatment. The blood concentration of the drug during the first 24 hours of therapy was of the order of from 40 to 80 gamma per c.c. and during the subsequent 3 days remained at a level of 20 gamma per c.c. Workers at the research division of Parke, Davis and Company (who furnished the chloromycetin for this study) had previously shown that E. typhosa is inhibited by a concentration of chloromycetin of approximately one-quarter gamma per c.c. when the 50-percent end-point technic is applied to fluid culture.

Patients in the first two weeks of their febrile course were selected for treatment with chloromycetin. The majority of the 10 patients were started on the drug about the tenth day of their fever. The mean duration of known fever prior to treatment in the 10 cases was 9.5 days. The course of the disease after the start of chloromycetin administration was followed by observations on the clinical condition, the fever, and the results of repeated blood, stool, and urine cultures.

Evidence of improved general condition and lessened toxicity was usually apparent within 24 hours after the start of chloromycetin, and increased thereafter. In the first 7 patients the temperature reached permanent normal levels after 3 days of treatment.

In 8 of the 10 patients, blood cultures were taken daily for 5 days following the initiation of treatment. All of these blood cultures remained sterile. In 2 of these 8 patients blood cultures were taken 2, 4, and 8 hours after the initial dose of chloromycetin. These cultures likewise remained sterile. After the fifth day from the beginning of therapy, because of the patients' normal temperatures, blood cultures were not taken except in those instances in which a positive stool culture was obtained. The 3 blood cultures taken because of this indication proved negative.

Because of the conditions under which this study was carried out, stool cultures could not be obtained on any regular schedule. However, no patient was discharged without 3 consecutive negative stool cultures having been recorded. Positive stool cultures after the termination of chloromycetin treatment were observed in 3 instances in two patients during their convalescence. In one of the patients the stool specimen obtained on the seventeenth day after the institution of therapy was positive. In the second patient positive stool cultures were recorded on the fifth and twelfth days. Repeated stool cultures thereafter in these two patients were negative.

Urine cultures before the beginning of chloromycetin therapy, during therapy, and in convalescence, were consistently negative.

Two of the 10 patients developed relapses with bacteremia occurring after afebrile periods of 10 and 16 days respectively. In both instances the recurrent infections responded promptly (3 and 2 days) to a second course of chloromycetin. It is of interest that the organisms isolated during the recurrence were as sensitive to chloromycetin when tested <u>in vitro</u> as were those isolated initially.

Two serious complications were encountered among 10 patients. These consisted of intestinal perforation in one, occurring on the second day of normal temperature; and massive intestinal hemorrhage in another, developing in the fourth afebrile day. Both recovered following a more or less stormy course, one after supplementary therapy with streptomycin and penicillin and the other after transfusions of whole blood.

The course of typhoid fever in 8 control cases was in striking contrast to that observed in the treated series. Of these 8 patients, one died on the seventeenth day of his illness. The average total duration of fever in the remaining 7 patients was 35 days.

The average treated patient began treatment on the ninth day of his illness and thereafter had 3.5 days of fever while the average control patient not receiving treatment on the ninth day ran fever for the ensuing 26 days.

The optimal schedule for administering the drug remains to be determined. (Ann. Int. Med., July '48 - T. E. Woodward et al.)

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A Preliminary Report on the Office Treatment of Severe Delirium Tremens with Recovery in Ten Hours: Studies of patients with delirium tremens reveal that they nearly always give a history of heavy drinking, very little eating, more drinking, and then not eating at all. Therefore, nutritional depletion (especially of vitamin B_1) is an important factor in the production of this illness.

Because of the shortage of hospital beds in both general and specialized hospitals, and also, because of hospital costs, it has been necessary to develop technics for treatment elsewhere in cases of acute alcoholism, including delirium tremens.

With the help of a nurse or a specially trained nurse's aide this can be done quite easily in office practice. After a short physical and neurological examination has been made, the patient is placed on a couch, given from 1 to 2 grains of phenobarbital and 3 grains of sodium dilantin (as an anticonvulsant). At the same time the arm is prepared for the injection intravenously of from 1,000 to 2,000 c.c. of 10-percent dextrose in normal salt solution which is begun right away. As this goes on, from 100,000 to 200,000 units of thiamin hydrochloride (vitamin B_1) and 25 units of insulin are introduced into the tubing. One and a half hours later another dose of phenobarbital and sodium dilantin is given; another dose of each is given 2 hours later; and a third dose about 3 hours later. No alcoholic beverage of any kind is given or allowed. Candy and heavily sugared orange juice should be available if mild insulin shock reactions occur.

This treatment will clear up uncomplicated cases of delirium tremens in individuals under 55 years of age in about 10 hours. In some instances it may be wise to administer another 1,000 c.c. of the glucose solution with insulin and vitamin B_1 on the following day. For several days after the first visit the patient should be kept on phenobarbital grains 1 and sodium dilantin grains 3, t.i.d. and at night, and from 50,000 to 100,000 units of vitamin B_1 intramuscularly. The following case is illustrative of the good results obtained by using this procedure.

A 37-year-old white bartender, divorced 2 months, was brought in on 25 June 1947. For about 3 months he had been drinking daily one-fifth of whiskey with innumerable beer-chasers but had been able to work until 19 June when he stayed home and for the next 2 and 1/2 days drank approximately from 1 and 1/2 to 2 fifths daily. On the night of the 21st he stopped abruptly and drank no more for the next 4 days. By the second day of abstinence he had become mildly visually hallucinated, was not sleeping or eating and was taking no fluids of any sort. Porgressively his delirium became worse so that members of his family had to restrain him by force. His visual hallucinations assumed frightening aspects, such as large rats gnawing his feet, wild-eyed cats scrambling over his body, and flames surrounding his bed. He was in this state when first seen by the author on 25 June. He was mumbling, screaming, and obviously in great terror and had to be carried in, because he could not walk.

He was immediately sedated with phenobarbital and sodium dilantin and placed in the treatment room at about 11 a.m., for an intravenous injection of 2,000 c.c. of 10-percent dextrose in normal salt solution with 25 units of insulin and 400,000 units of vitamin B_1. Throughout the intravenous procedure his visual hallucinations continued vividly. After the first intravenous injection was completed, he continued to be delirious but in a comfortable relaxed manner, sometimes "tending bar," then garrulously talking with various acquaintances about old times, and most carefully smoking nonexistent cigarettes and flicking the ashes into an equally nonexistent ash tray, and also repairing watches.

This condition lasted for about 4 hours. He was then given an additional intravenous injection of 1000 c.c. of glucose in saline with the same amounts as before of insulin and vitamin B_1. After receiving nearly 500 c.c. he was able to answer simple questions in a monosyllabic but accurate and rational manner. At the completion of this treatment he was able to walk with very little support, and, at 6 p.m., only 7 hours after therapy had begun, he was entirely clear mentally and able to walk, though with a flail-like gait, to an automobile about 20 yards away and to climb in unassisted.

The next morning he returned and was given another intravenous injection of 1,000 c.c. of glucose in normal saline with 25 units of insulin and 100,000 units of vitamin B_1. He had slept well, was quite calm, and entirely rational. The only residuals noted were a moderately severe polyneuritis involving chiefly the lower extremities, a feeling of great weakness, and tremor of hands. He remained at rest for several hours with mild sedation, was then given 300,000 units of vitamin B_1 intramuscularly, and sedation for the night with orders for continued use of sugared orange juice. On the next day he was again given the same amount of vitamin B_1; he required no further medication. One week after the author first saw him in an acutely delirious state he had entirely recovered, with appetite, spirits, and sleep reported as excellent.

This expedient and practical technic has been used with safety and marked success with increasing frequency by the author in the past 5 years in the uncomplicated cases of delirium tremens. (Am. J. Psychiat., Aug. '48 - R. V. Seliger)

Re False Brucellosis Diagnosis: C. W. Eisele (one of the authors of this report) and co-workers summarized a previous study published in the Journal of the American Medical Association of 13 December 1947 by stating (1) that of 100 persons who had been vaccinated against cholera while in military service, positive blood serum agglutination reactions against a bacterial antigen used in the diagnosis of brucellosis occurred in 56 in a titer of 1:20 or higher, in 41 in a titer of 1:40 or higher, and in 20 in a titer of 1:80 or 1:160; (2) that, out of 11 (of these 100 persons) tested from 18 to 28 months after vaccination 3 still gave positive reactions in titers of 1:40 or higher; and (3) that because agglutinating antibodies against the organisms of brucellosis are produced as a result of cholera vaccination, it may reasonably be expected that unless this fact is widely recognized, added confusion will occur in the diagnosis of chronic brucellosis, a disease which is already notoriously difficult to diagnose.

It had been shown that individuals immunized with vaccines consisting primarily of Cholera O antigen failed to develop agglutinins that react positively with bacterial antigens used in the diagnosis of brucellosis, although the majority of those receiving the standard Army vaccination (HO antigen) yielded significant agglutinin titers. Agglutinin-absorption tests on 5 serums from individuals receiving cholera vaccine indicated that this interrelationship was due to an H antigen of Vibrio comma.

In an investigation undertaken to elucidate further this antigenic relationship, it has been established that the shared antigen responsible for cross-immunological reactions between the organisms of the genus Brucella that are pathogenic for man and the Vibrio comma is an H antigen of the latter organism. The Brucella melitensis strain that was used showed minor qualitative variation in this shared antigen. Different strains of the same species of the organisms causing brucellosis exhibited quantitative variation in this antigen. Because the removal of agglutinins for Vibrio comma from brucella antiserums failed to lower the homologous titers, this shared antigen is obviously a minor antigen of the three species of Brucella pathogenic for human beings.

In testing the antiserums produced with the same strains of cholera and brucellosis organisms in different species of animals, great differences in the cross reactivity of the serums have been noted. It is conceivable that strain and host differences might be made the basis of an immunological method of differentiating the organisms causative of brucellosis.

Preliminary data on a limited number of strains suggest that diminution or loss of this shared antigen may be of use as a sensitive test for the detection of early dissociative change in the brucellosis group.

That two groups of organisms, seemingly as unrelated as these should show antigenic similarity is not unusual. Because the H antigens of Vibrio comma are shared by many noncholera vibrios, it is to be expected that many of these may be immunologically related to those of the genus Brucella. (J. Infec. Dis., July-Aug. '48 - N. B. McCullough et al.)

The Effect of an Acidulated Fluoride Mouthwash re Dental Caries: The demonstration that a reduction of approximately 40 percent in the occurrence of new caries resulted from making three topical applications per year of a fluoride solution containing as little as 0.1-percent sodium fluoride suggested to us that more frequent applications of even more dilute fluoride solutions such as could be incorporated in a mouthwash might have a similar caries-reducing effect. That low concentration of fluoride might confer an added caries resistance to the teeth is indicated by evidence that fluoride concentrations as low as one part per million in drinking water may act topically to reduce caries. That only a brief contact between fluoride solutions and the teeth is needed is suggested both by laboratory observations and by the finding that fluoride treatments give smaller caries reductions between treated and untreated quadrants in lower than in upper teeth. This is apparently the result of a greater leakage of fluoride to the untreated teeth of the lower jaw during the period of treatment. Bossert and Dunning have reported that fluoride solutions maintain an effective concentration in the mouth when used as a mouthwash. These considerations made it seem worth while to test again the possibility of reducing caries by the use of a fluoride-containing mouthwash.

Uncertain results had been obtained from the few other studies that have been reported on the effectiveness of the use of fluoride containing mouthwashes in dental caries prevention. Therefore, an investigation designed to result in more conclusive data was organized among the sixth-grade children of 12 Massachusetts schools, and because laboratory studies had indicated that the best results could be expected from the use of acidulated fluorides, a solution containing 0.01-percent sodium fluoride at pH 4.0 was decided upon. The control mouthwash was the same except that the fluoride was omitted.

An examination of the teeth of more than 500 children was made by means of a mirror and explorer and the data on caries incidence recorded in a way which would enable it to be transferred to punch cards for machine sorting. On the basis of the findings in this dental examination, the schools were paired so that they fell into two groups, each containing more than 250 children which matched each other as far as social and economic conditions and caries activity were concerned.

Because it was the feeling of the authors that under the usual conditions of home life children the age of their study group would not use a mouthwash more frequently than once or twice a week, they avoided setting up an experiment requiring an artificially high frequency of mouth washing. It was their feeling that in the absence of close supervision any therapeutic procedure which depended upon daily or nearly daily use by children was almost certainly going to fail. Accordingly, the mouthwashes were used only twice weekly.

The mouth washing was carried out first under the direct supervision of the authors and subsequently under supervision of the school teachers. In the early

part of the morning session the children, who had been instructed to present themselves with well-brushed teeth, were arranged in line and given mouthwash in paper cups at one point in the school building. Tooth rinsing was begun immediately and continued until the line of children reached a sink where the mouthwash could be expectorated. In this way it was possible to insure that the children held the mouthwash in their mouths for a period of at least one minute. During the summer vacation period, each child was supplied with an individual bottle of mouthwash and given suitable instructions regarding its continued use. Neither the teachers in the schools nor the students knew whether a fluoride-containing or a fluoride-free mouthwash was being used. The mouthwashes were indistinguishable in taste and of such pleasant flavor that both were in high demand by those not required to participate in the experiment.

After a period of one year of mouthwash use, the participating children were re-examined. Unfortunately, it was necessary to use a different examiner from the one who made the first examination. The second examiner had no knowledge of which children were using the fluoride mouthwash. In about 2 percent of the recordings the interpretations of the original or the second examiner were open to question. Such recordings are excluded from the tabulations. At the end of the one-year period, only 187 of the children who had consistently used sodium fluoride mouthwash and 169 of the children using the control mouthwash were available for re-examination. A summary of the findings is presented in the table below.

TABLE I

CARIES ATTACK IN PERMANENT TEETH OF CHILDREN USING MOUTHWASHES

MOUTHWASH	NO. OF PATIENTS	SOUND TEETH AT BEGINNING OF STUDY	NEW D F TEETH	ATTACK RATE (TOOTH) (PER CENT)	SOUND SURFACES AT BEGINNING OF STUDY	NEW D F SURFACES	ATTACK RATE (SURFACE) (PER CENT)
Fluoride	187	2,593	256	9.9	16.429	564	3.4
Control	169	2,397	177	7.4	14,730	409	2.8

It is obvious that the fluoride-containing mouthwash did not bring about a reduction in caries activity. On the other hand, it appears that the caries activity was actually higher in the children using the fluoride mouthwash than in those using the control mouthwash, there being an increase of approximately 30 percent in the tooth attack rate and about 20 percent in the surface attack rate in the former group.

The finding that there was no reduction in caries activity as the result of using this acidulated fluoride mouthwash was not too surprising, but the discovery that its use apparently increased caries activity demands explanation. On one hand, the authors had laboratory evidence that acidulation of fluoride solutions increases their capacity for protecting enamel against acid decalcification. On the other hand, the available clinical evidence does not show that acidulated fluorides have an increased effectiveness in reducing the activity of dental caries. Neither this study nor the published reports (Arnold, Dean and Singleton, and Bibby, Zander, McKelleget, and Labunsky) on the clinical use of

acidulated solutions of sodium fluoride show a reduction of caries. The authors also have evidence that topical applications of acidulated lead fluoride solutions are less effective than neutral solutions in combating caries. In addition, animal experiments have actually revealed a caries increase after topical applications of acidulated sodium fluoride. In short, all efforts to reduce caries by using acidulated fluorides have failed.

Speculation as to how this apparent reversal in the effect of sodium fluoride is brought about is complicated by the absence of definite knowledge of the way fluorides react with the teeth to make them resistant to dental decay. An explanation may be that in the laboratory studies where fluoride buffers of a pH lower than the iso-electric point of enamel were used, there may have been active decalcification followed by adsorption of calcium fluoride or some other fluoride compound on the enamel which then served to protect the enamel surface from the action of acid. It is possible that, if, in the laboratory studies the pH of the system had been raised to the other side of the iso-electric point, the adsorbed material might have been released, leaving an unprotected enamel surface. This possibility has not been tested. The authors consider that in the mouth, fluorine compounds adsorbed during the treatment with the acidulated fluoride would be lost as soon as saliva gained access to the teeth and restored the pH to its normal level. If such changes do occur in the mouth, there would result not only the immediate removal of the fluoride-protecting factor which modified the test tube results but also the loss, through decalcification, of a microscopic layer of the original tooth surface which may have previously acquired a surface acid resistance of some other sort. (J. Dent. Research, Aug. '48 - J. F. Roberts et al.)

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How Abrasive Need a Dentifrice Be?: The outstanding advantage of a liquid dentifrice is its nonabrasiveness. This characteristic has been demonstrated by several investigators. The outstanding disadvantage of the liquid dentifrice is that an appreciable percentage of persons develop a visible brown to black stain on the teeth while using it. Such a condition was noted by one of the authors (P.C.K.), as early as 1938 while working with a new liquid dentifrice with a group of dental students used as test subjects. It was observed that about 16 percent of a group of sixty students had readily visible tooth staining after using a 2.5-percent sodium lauryl sulfate liquid dentifrice. The degree of staining that occurs is an individual characteristic. It was also noted that this stain did not occur on porcelain restorations and did not react to iodine disclosing solution in the manner of a carbohydrate.

It is quite evident that this stain is not related to a peculiar property of any liquid dentifrice but that it is merely something that a nonabrasive dentifrice does not remove. As reported by Manly, one or two applications of abrasive dentifrice usually will remove the stained pellicle.

The whole question of dentifrice abrasiveness has been brought into sharper focus by this stained pellicle. That there is a great variation in the ability of commercial dentifrices to cut into the cervical areas of teeth (abrasiveness) has been shown by Kitchin and Robinson. That many individuals require some abrasiveness in dentifrices if they are to remain stain free is generally concluded as a result of the performance of liquid (nonabrasive) dentifrices. The important question is, "How abrasive need a dentifrice be?"

In the light of the fact that the only recognized function of a dentifrice is to aid the brush in cleaning the accessible tooth surfaces, it would seem reasonable to answer that a dentifrice should be just abrasive enough to cause the teeth to remain free from stain. It should be no more abrasive, however, because any loss of cementum or dentin on exposed cervical areas is undesirable.

The authors have reported on the abrasiveness of twenty-one dentifrices ranging from water, with practically no abrasive action when used on the cervical area of a tooth, to a commercial tooth powder capable of cutting a notch four and one-half millimeters deep in 100,000 cross strokes. The purpose in computing this graded series was to be able to test each dentifrice on a group of heavy stainers so that it would be possible to correlate the abrasion factor of each with its ability to prevent visible stain accumulation. The ability of a dentifrice to prevent the accumulation of a stained pellicle on the teeth was determined through its use by individuals who had shown themselves to be heavy stainers when they used a brush and water for a two-week period.

As a result of screening 113 dental students, twenty relatively heavy stainers were selected, fifteen of whom constituted the original test group. Each test of a dentifrice on this group occupied a two-week period; eighteen of the dentifrices and salt and soda were tested. In addition, basic stain tests on brush and water were conducted. The original fifteen stainers were used for the first five test periods. At the end of this time three were lost to the test group by graduation. For the succeeding nine test periods the remaining twelve individuals constituted the test group of stainers. At the end of that time seven more graduated. The group of five remaining stainers was then augmented by the unused five of the original pool of twenty. This group of ten was used for all the remaining stain tests.

Whenever individuals left the test group, or were introduced into it, they were checked for staining by a two-week period on brush and water. This gave assurance that they had not changed from stainers to nonstainers during their time on the tests or while awaiting entrance into the test group. For those entering the test group late, the more recent stain score on water was used for comparison with results on various dentifrices.

In every test, stainers started with clean teeth and a new professional model medium nylon bristle toothbrush. There was no attempt to influence the individual's method of tooth brushing.

At the end of each test period the amount of stained pellicle on each of the twelve anterior teeth (six upper and six lower) of each test subject was determined independently by each examiner (H.B.G.R. and P.C.K.). There was a surprising degree of uniformity between these scores.

From the individual stain scores of each tooth, the percentage of all teeth with visible stain at the end of each dentifrice test period was determined. The use of mere visibility stain, rather than any definite degree of visibility, removed the question of judgment concerning whether the degree of stain was 1, 2, 3, or 4. If it was visible it was objectionable; and if a greater percentage of all the teeth were visibly stained, the condition was more objectionable than if a lesser percentage showed visible stain.

The table below gives a summary of the abrasiveness and stain-removing ability of each dentifrice as determined and recorded by the authors.

TABLE I

SUMMARY OF DATA ON ABRASION AND STAIN TESTS

DENTIFRICE	DENTIN CUT (MM. PER 100,000 STROKES)	AVERAGE STAIN SCORE	PER CENT OF COOPERATORS WITH ONE OR MORE TEETH WITH STAIN SCORE OF 1 OR MORE	PER CENT OF ALL TEETH WITH STAIN SCORE OF 0 OR ± (STAIN NOT VISIBLE TO NAKED EYE)	PER CENT OF ALL TEETH WITH STAIN SCORE OF 1 OR MORE (VISIBLE STAIN)	SAFETY INDEX*
Water	0.006 ± .0056	25.3-26.9	100.0	8.4	91.6	1400
4699 B	0.12 ± .0200	10.6	93.3	49.7	50.3	414
4780	0.24 ± .0380	5.1	58.3	81.8	18.2	341
4781	0.26 ± .0405	No test				
Colgate paste	0.31 ± .0334	4.9	53.3	81.6	18.4	263
Salt and soda	0.31 ± .0479	No test				
4911 B	0.41 ± .0316	4.4	41.7	84.6	15.4	206
4680 B	0.42 ± .0562	5.7	71.0	76.7	23.3	182
5079	0.48 ± .0767	3.6	30.0	92.5	7.5	193
4660 B	0.56 ± .0915	6.0	66.7	78.8	21.2	141
Pepsodent paste	0.56 ± .0690	3.3	41.7	90.9	9.1	162
4774	0.61 ± .0245	5.8	70.0	81.5	18.5	134
Pycopay	0.67 ± .0318	5.5	66.0	79.7	20.3	119
4770	0.86 ± .0435	4.7	58.3	83.9	16.1	97
Listerine paste	0.98 ± .1727	2.1	26.6	96.0	4.0	98
4700 B	1.07 ± .0890	3.9	41.7	86.7	13.3	81
Ipana paste	1.25 ± .0898	2.0	40.0	95.0	5.0	76
Colgate powder	2.02 ± .3115	0.9	20.0	98.3	1.7	49
Pepsodent powder	2.26 ± .188	0.6	0.0	100.0	0.0	44
Calox powder	3.23 ± .868	No test				
Dr. Lyon's powder	4.48 ± .553	0.6	8.3	99.3	0.7	22

*Safety Index = $\frac{\%\text{ of teeth with scores of 0 or } \pm}{\text{mm. of dentin cut per 100,000 strokes}}$

The average stain scores (Column 3), while significant for dentifrices of widely varying abrasive qualities, fail to correlate with small differences. They also fail to give any data as to the distribution of the stain scores on which they are based.

The percentage of cooperators with one or more teeth with stain visible to the naked eye (stain score 1 or more, Column 5) shows correlation with dentifrice abrasiveness only in a general way. It should be noted that an individual could be put in this category as a result of one lingually displaced tooth which

was relatively inaccessible to the brush. This column, as well as the average stain scores, brings out some of the weaknesses of the system of stain scoring used.

Columns 5 and 6 are complementary and are believed to be more significant. They take into account all the teeth scored, and differentiate between teeth with stain visible to the naked eye and teeth with no stain, or not enough to be evident to the naked eye.

In order to correlate abrasive effects and cleaning ability the authors have constructed a curve using the percentages of teeth with stain visible to the naked eye on the ordinate and the dentin cut per 100,000 strokes on the abscissa. From such a curve it is apparent that stain-removing ability is generally in direct relationship to the ability to abrade dentin. More specifically, however, there is a sharp drop in the percentage of visibly stained teeth as the abrasiveness rises from 0.0 to 0.6. This drop is less from 0.6 to 1.0, but still marked. Beyond an abrasiveness of 1.0, any cleaning ability is purchased at the cost of an excessive loss of cementum and dentin.

If the safety of a dentifrice may be considered on the basis of the number of stainers' teeth maintained free of visible stain per millimeter of dentin abrasion, the safety index can be computed by dividing the number of teeth with $\pm$ or 0 scores by the dentin cut per 100,000 strokes of the dentifrice concerned. This is given in Column 7 of the table. An individual with cervical exposure should, it is believed, use a dentifrice with as high a safety index as is consistent with the inhibition of visible stain. Practically, this indicates that nonstainers may use nonabrasive dentifrices with entirely satisfactory results. A stainer will require some degree of abrasive action to prevent the accumulation of stain. The least abrasive dentifrice which will present stain accumulation is the most desirable; it might be determined by trial on any individual. Until there is found for use in a dentifrice some nonabrasive material that will prevent or remove staining, as high as from 50 to 75 percent of the population will require some degree of abrasiveness in their dentifrices. Dentifrice abrasiveness should be considered as a necessary evil to be avoided as much as possible.

The authors state that reliable current information on dentifrice abrasion, as determined on cervical areas of cementum and dentin, should be available to the public as long as some abrasiveness is considered a necessary or desirable characteristic of a dentifrice. They also believe that such data, to be valid, should be secured by testing dentifrices on dentin, and not by tests on the abrasive agents alone.

Dentifrice abrasiveness greater than that necessary to cut 1 mm. per 100,000 strokes into the cervical area of teeth with the apparatus employed, appears to be unnecessary even for very heavy stainers who would not constitute more than 20-percent of a population. Only one of the commercial paste dentifrices

tested was excessively abrasive for heavy stainers. The commercial powders tested, with one exception, were from 100 percent to 300 percent more abrasive than was found necessary to accomplish stain prevention in these tests on heavy stainers.

Generally speaking, for stainers with cervical exposure, a dentifrice with a safety index as high as is consistent with prevention of stain accumulation is desirable. Such a dentifrice should be determined on an individual basis. (J. Dent. Research, Aug. '48 - P. C. Kitchin and H. B. G. Robinson)

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The Ability of Thymidine to Replace Vitamin B_{12} as a Growth Factor for Certain Lactobacilli: Shive et al. recently have reported the isolation from liver of a crystalline factor functionally related to folic acid. Preliminary investigation of the structure by Doctor Shive indicates that the compound is thymidine (thymine desoxyriboside). Doctor Shive has furnished the authors with a sample of the isolated factor for microbiological study. The authors have found that for certain lactic acid bacteria thymidine is able to replace the requirement for vitamin B_{12}. The data obtained with Lactobacillus lactis (ATCC 8000) are being reported together with an interpretation of these findings.

The study revealed that growth comparable to that obtained with liver is observed in the presence of from 0.4 to 2.0 γ of thymidine per tube. Thymine is inactive under these conditions. Obviously, from the comparatively large amounts of thymidine required for optimal growth of the organism, thymidine is not vitamin B_{12}. The authors interpret these data as indicating that vitamin B_{12} functions as a co-enzyme in carrying out reactions concerned with conversion of thymine to thymidine, since in the presence of thymidine the vitamin no longer is required by Lactobacillus lactis.

By analogy the microbiological evidence reported indicates that the primary biochemical defect in pernicious anemia may well be the inability to synthesize certain nucleosides, particularly thymidine, from parent purines or pyrimidines. Thus it would appear that the curative effects observed in this disease with folic acid arise from increased thymine synthesis, which by mass action effects yields more thymidine. The effectiveness of large amounts of thymine in pernicious anemia may be explained similarly. (J. Biol. Chem., Aug. '48 - L. D. Wright et al.)

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The Uptake by Plants of Plutonium and Some Products of Nuclear Fission Adsorbed on Soil Colloids: It has been found that barley and pea plants take up the fission elements Y (yttrium), Ce (cerium), Zr (zirconium) + Cb (columbium), Te (tellurium), Sr (strontium), and the three valence states of Pu (plutonium), even when these elements are present in trace amounts on the surfaces of clay or soil particles. For all the elements tested, the greatest fixation is in or on the roots. With the exception of Sr, translocation occurs only to a limited extent. The translocation of Sr is relatively quite large. Activity levels of 0.1 microcuries per gram of soil are sufficient to cause very pronounced injury over a three-months period. (Technical Information Pilot, Sc. and Technol. Proj. by Library of Congress for Office of Naval Research, 13 Aug. '48. Abstract furnished by Atomic Energy Commission of article by L. Jacobson and R. Overstreet)

Correspondence Course in Nuclear Physics Available: The Bureau of Naval Personnel offers a correspondence course entitled "Elementary Nuclear Physics" (NavPers 10775). This course is available to all naval officers, including those of the Naval Reserve on inactive duty. The course is based on the 1 July 1946 extra issue of All Hands, devoted to the atomic bomb tests at Bikini, and on "Applied Nuclear Physics," by Pollard and Davidson. It is believed that those who study the material presented in this course will acquire a sufficient foundation in the principles of atomic physics to give them a clearer understanding of the medical problems connected with atomic nuclear energy, particularly those resulting from explosion of atomic bombs. The material for this course is issued by the Correspondence Course Center on custody receipt.

Officers desiring to enroll for this course are requested to address their applications via official channels to the Correspondence Course Center as designated below according to location:

For Naval Districts: 1, 3, 4, 5, and 10, and PRNC and SRNC
Naval Correspondence Course Center
Bldg. 4, N. Y. Naval Shipyard
Brooklyn 1, N. Y.

For Naval District 9
Naval Correspondence Course Center
Ninth Naval District
Great Lakes, Illinois

For Naval Districts: 6, 8, and 15
Naval Correspondence Course Center
Bldg. 2, U. S. Naval Station
New Orleans 14, La.

For Naval Districts: 11, 12, 13, 14, and 17
Naval Correspondence Course Center
Treasure Island
San Francisco, California

(Atomic Defense Div., BuMed)

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Radiological Health Officer's Mission and Tasks: Because of a wide use of radioactive compounds in medicine and industry and the growing general interest in radiological problems, the Bureau desires to disseminate more widely a statement of the mission and tasks of a radiological health officer which, in 1947, was promulgated, as set forth below, to the few addressees concerned.

It is believed that the Mission and Tasks as outlined are adequate to provide general guidance in connection with such radiological safety and health programs as are at present under way.

A Radiological Health Officer may be defined, for the present, as a medical officer who has had special training and/or experience qualifying him to advise in matters concerned with the health aspects of radiological safety and to provide adequate medical supervision to protect the health of personnel exposed to possible radiation hazards.

A relatively small number of medical officers has been assigned by the Bureau of Medicine and Surgery to perform the duties of radiological health officers at the several stations where they are most needed. It is contemplated that at other activities where operations involving possible exposure to radiological hazards are conducted that the medical officer of the station assume such cognizance.

THE RADIOLOGICAL HEALTH OFFICER

Mission

Under the Commanding Officer to establish, develop, and execute plans for safeguarding the health of personnel engaged in all operations involving exposure to radiological hazards.

Tasks and Functions

1. To serve as principal advisor to the Commanding Officer in all matters pertaining to the medical aspects of radiological safety.

2. To maintain sufficiently close contact with the operations conducted so as to be able to evaluate all radiological hazards.

3. To conduct the radiological health program in such a manner as to support the over-all Radiological Safety Plan of the command.

4. To conduct medical examinations and otherwise to observe the health status of personnel engaged in all operations involving radiological hazards, and of all personnel prior to and upon completion of their assignment to such duty.

5. To provide such health monitoring, including photographic dosimetry, as may be necessary to ascertain the degree of radiological exposure of personnel.

6. To provide such medical supervision as may be required in effecting the decontamination of personnel who have been in contact with radioactive material, and of their clothing and individual equipment.

7. To maintain a system of regular inspection of all radiological safety arrangements in order to assure complete compliance with all local safety requirements and with those established by higher authority.

8. To provide immediate care for personnel who may be injured while engaged in any activity involving exposure to radiological hazard.

9. To make adequate arrangements for definitive medical care and treatment as necessary for personnel who may have received any radiological injury.

10. To supervise the professional and technical work of all medical and other personnel under his cognizance.

11. To report to the Commanding Officer as well as to the Bureau of Medicine and Surgery any serious infractions of radiological safety discipline and violations of radiological safety regulations.

12. To advise the Commanding Officer in the preparation of radiological safety regulations applicable to the Command.

13. To maintain adequate records as required by local regulations and by higher authority and to submit all reports of radiological health operations required by the Bureau of Medicine and Surgery and other higher authority. (Atomic Defense Div., BuMed)

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Dental Technician Rating: The general-service rating, Dental Technician, is a peacetime or basic rating which is held by men on active duty in the regular Navy. Men are trained for this rating in the three Class A Dental Technician Schools, located at NTC, San Diego, California, NTC, Great Lakes, Illinois, and NNMC, Bethesda, Maryland.

The dental rating group follows:

Rate	Rate Abbreviation	Pay Grade
Dental Recruit	DR	7th
Dental Apprentice	DA	6th
Dentalman	DN	5th
Dental Tech. 3rd Class	DT3	4th
Dental Tech. 2nd Class	DT2	3rd
Dental Tech. 1st Class	DT1	2nd
Chief Dental Technician	DTC	1st

The rating, Dental Technician, leads to Warrant Officer and Chief Warrant Officer, Code 8173, Dental Clerk. (See Medical News Letter of 9 April '48, p. 29.)

Dental technicians perform numerous routine duties such as assisting dental officers in treating patients, giving oral prophylactic treatments under supervision, exposing and developing dental x-ray films, setting up artificial teeth and fabricating artificial dentures, rendering first aid, and maintaining various dental records. In addition to being qualified to perform the routine duties, dental technicians may obtain training and become qualified as specialists in the following technical fields: dental technology (prosthetic), maintenance and repair of dental equipment, dental research, dental clerical procedures, property and accounting, clinical laboratory technology, x-ray procedures, pharmacy and chemistry, dental photography, dental chemistry, dental illustration, sound motion picture operation, dental stenography, and acrylic eye illustration.

The military and technical qualifications for advancement in the dental technician rating are set forth in the Manual of Qualifications for Advancement in Rating (NavPers 18068).

Members of the Organized, Volunteer, and Fleet Naval Reserve on inactive duty are trained in the emergency-service ratings. In time of a national emergency the entire Navy would shift to the system of emergency-service ratings, placing personnel of the regular Navy and of the Naval Reserve on the same basis. The general-service rating for dental technicians is broken down into three emergency-service ratings:

(1) Dental Technician General DTG
(2) Dental Technician Prosthetic DTP
(3) Dental Technician Repair DTR

(Dental Div., BuMed)

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BUMED CIRCULAR LETTER 48-89 23 August 1948

To: All Ships and Stations

Subj: Typhoid-Paratyphoid Immunization; Changes in

Ref: (a) Paragraph 35B10, Section III, Part III, Chapter 5B, Manual of the Medical Department, U. S. Navy

1. In view of the fact that it has been shown that 0.5 c.c. amounts of triple typhoid vaccine can be used in all three doses of the initial immunization with fewer and milder reactions together with the same or higher levels of protective titer, the following method of initial typhoid-paratyphoid immunization shall be adopted as the standard method:

> Initial immunization shall consist of three (3) consecutive subcutaneous injections of one-half cubic centimeter (0.5 c.c.) of triple typhoid vaccine at intervals of not less than seven (7) or more than twenty-eight (28) days.

2. For the sake of uniformity in immunization practices in the Armed Forces, the subcutaneous injection of 0.5 c.c. typhoid-paratyphoid vaccine as a booster dose is an acceptable alternate method to the Navy's standard 0.1 c.c. intracutaneous injection.

3. Reference (a) is in the process of being changed accordingly.

--BuMed. H. L. Pugh

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BUMED CIRCULAR LETTER 48-90 23 August 1948

To: All Ships and Stations

Subj: Marital Contacts of Navy and Marine Corps Venereal Disease Patients; Reporting of

Ref: (a) Par. 12B6.2, Manual of the Medical Department

1. Reference (a) permits the use of routine venereal disease contact reporting procedures for investigation of marital contacts of Navy and Marine Corps venereal disease patients, only where all other practicable methods of handling and completing the investigation within the naval service, by a private physician, or clinic of contact's choice, have been exhausted.

2. Reports have been reaching this Bureau indicating laxity in handling marital contacts. In some cases where the patient states that his wife will receive medical care from a civilian source, no effort is made to determine whether examination or treatment is actually received. In some cases no effort is made to determine if the spouse has had other contacts, and there are others in which the marital contact does not have adequate follow-up.

3. In view of the above, the following procedure is outlined and shall be strictly adhered to:

(a) It shall be the responsibility of the medical officer of the reporting activity to carry out the investigation of all reported marital contacts as directed. He shall assure himself that examination, and treatment if indicated, are initiated, either within the naval service (dependents dispensary), by private physician, or clinic of contact's choice. Reports of extra-marital contacts of the spouse should be obtained and forwarded to cognizant authorities, in accordance with local public health regulations, when the spouse is under the care of a naval medical officer.

(b) The marital contacts of Navy patients shall be reported on NavMed-171. Copy C shall be forwarded according to existing instructions, indicating under "remarks" how the investigation of marital contacts is being handled. Copies A, B, and D shall be retained until examination and/or treatment is initiated, either in military facilities, by private physician, or clinic of contact's choice. Copy B shall then be forwarded showing results of investigation. Copies A and D shall be destroyed and Copy E retained for files. Prompt investigation and forwarding of results by the reporting activity is imperative.

(c) When the above methods are unsuccessful, and in the event the patient indicates his spouse will report for medical treatment and no satisfactory evidence is shown that she has in fact reported for examination or treatment, or if the spouse lapses treatment or follow-up while under the professional care of a naval medical officer, Copies A, B, and D shall then be forwarded to Naval and Public Health authorities in accordance with existing instructions for non-marital contacts. The patient shall be advised of the action taken.

(d) Every married patient with venereal disease shall be fully informed of the dangers and implications of venereal infection to himself, his spouse, and his family, advising him of the urgent necessity of investigating all contacts with the aim of safeguarding the physical and mental health of the family, of protecting the public health, and of preventing possible familial infection.

4. It is again emphasized that all contact reports are considered to be in the nature of a privileged communication and should be restricted to proper hands in medical channels only.

--BuMed. H. L. Pugh

BUMED CIRCULAR LETTER 48-91 27 August 1948

To: All Ships and Stations

Subj: Serum Albumin and Plasma; Extension of Potency Period for

Refs: (a) BuMed CirLtr 48-49
(b) Alnav 33 of 8 February 1945
(c) Alnav 162 of 17 July 1945
(d) Alnav 336 of 12 October 1945
(e) Alnav 592 of 14 November 1946

1. References (a), (b), and (c) are hereby cancelled and superseded by this letter.

2. A seven (7) year dating period for 1-582-010, Albumin, Serum, Human, 25 Gm., 100 c.c.; 1-582-045, Albumin, Serum, Human, Salt Poor, 25 Gm., 100 c.c.; and 1-607-104, Plasma, Normal, Human, Dried, 500 c.c., has been allowed.

3. Accordingly the following action shall be taken on subject items in order to increase the potency dating shown on the containers to 7 years:

(a) All Serum Albumin now in stock which has a manufacturer's labeled expiration date ending any time in the calendar years 1945, 1946, or 1947 shall be extended four (4) years from the date shown on the package. All other expiration dates for Serum Albumin shall be extended two (2) years. The reason for this is that Serum Albumin manufactured in 1942, 1943, and 1944 was given only a 3 years' potency dating at time of manufacture; that manufactured in 1945 and later was given a 5 year potency dating at time of manufacture.

(b) All Plasma, Dried, now in stock which has a manufacturer's labeled expiration date of 1945 or earlier shall be extended four (4) years from the date appearing on the package. All other expiration dates for Plasma, Dried, shall be extended two (2) years. The reason for this is that the Plasma manufactured in 1945 or earlier was given only a 3 year potency dating at time of manufacture; that manufactured in 1946 and later was given a 5 year potency dating at the time of manufacture.

4. The potency period of the above three items may eventually extend beyond seven (7) years; therefore, none of these items shall be discarded without first obtaining instructions from the Bureau of Medicine and Surgery.

5. The provisions of references (d) and (e) remain in effect.

--BuMed. H. L. Pugh

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BUMED CIRCULAR LETTER 48-92 27 August 1948

To: All Ships and Stations

Subj: Requisitioning, Receipt Procedures, and Establishment of Stock Levels for Medical Stores

Ref: (a) BuMed Circular Letter 48-73 of 24 June 1948; N.D. Bul. of 30 June 1948, 48-470.

This letter contains instructions for modifying BuMed Circular Letter 48-73 of 24 June 1948 (N.D. Bulletin of 30 June 1948, 48-470).

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BUMED CIRCULAR LETTER 48-93 2 September 1948

To: All Stations, and Fleet, Force, and Area Commands

Subj: Quarterly Report of Rodent Control Operations; Cancellation of

Ref: (a) BuMed Circular Letter No. 48-18 dtd 12 Feb 1948; N.D. Bul. of 15 Feb 1948, 48-87.

1. Reference (a) is hereby cancelled. The Quarterly Report of Rodent Control Operations is no longer required and shall be discontinued immediately.

2. It is directed that pertinent data on rodent control be included in paragraph "D" of the sanitary report as required by paragraphs 35D9 and 35D12, Manual of the Medical Department.

--BuMed. C. A. Swanson

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